IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application	: **09/836,096**	Confirmation	: **7718**
Applicant(s)	: **GATEPIN, Philippe**	T.C./Art Unit	: **2621**
Filed	: **17 Apr 2001**	Examiner	: **CZEKAJ, David J.**
		Atty. Docket	: **FR-000041**

Title: **BIT RATE ALLOCATION IN JOINT BIT RATE TRANSCODING**

Mail Stop: **APPEAL BRIEF - PATENTS**
Commissioner for Patents
Alexandria, VA 22313-1450

APPEAL UNDER 37 CFR 41.37

Sir:

This is an appeal from the decision of the Examiner dated 14 June 2006, finally rejecting claims 2-7 of the subject application.

This paper includes (each beginning on a separate sheet):

1. **Appeal Brief;**
2. **Claims Appendix;**
3. **Evidence Appendix; and**
4. **Related Proceedings Appendix.**

APPEAL BRIEF

I. REAL PARTY IN INTEREST

The above-identified application is assigned, in its entirety, to **Koninklijke Philips Electronics N. V.**

II. RELATED APPEALS AND INTERFERENCES

Appellant is not aware of any co-pending appeal or interference that will directly affect, or be directly affected by, or have any bearing on, the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claim 1 is canceled.

Claims 2-7 are pending in the application.

Claims 2-7 stand rejected by the Examiner under 35 U.S.C. 103(a).

These rejected claims are the subject of this appeal.

IV. STATUS OF AMENDMENTS

No amendments were filed subsequent to the final rejection in the Office Action dated 14 June 2006.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The invention addresses a method and system for multiplexing the outputs of a plurality of transcoders. In an example embodiment (applicant's FIG. 2), each transcoder (TC[1] ... TC[n]) receives an input stream (ICS[i]) at an input bit rate (Rin[i]) and provides an output stream (OCS[i]) at an output bit rate (Rout[i]) (applicant's page 3, lines 29-34); a controller (CONT) is configured to allocate the output bit rate (Rout[i]) to each encoder based on a total bit rate capacity, and based on parameters determined from the input streams (page 4, lines 1-12; page 5, lines 5-10).

As claimed in independent claim 2, an embodiment of the invention comprises a method of controlling a plurality of transcoding channels (TC[i] of FIG. 2), a transcoding channel (TC[i]) allowing an input compressed data signal (ICS[i]) encoded at an input bit rate (Rin[i]) to be converted into an output compressed data signal (OCS[i]) encoded at an output bit rate (Rout[i]) wherein a regulation process uses quantization scales and the input compressed data signal to determine a video encoding complexity (page 5, lines 5-10), said method comprising the steps of:

computing a weighting factor (wf[i]) of a compressed data quality for the respective transcoding channels, the weighting factor being computed for a current picture of the input compressed data signal as an average, over a set of preceding encoded pictures, of an average quantization scale over a preceding picture and a number of bits used to encode the same preceding picture (page 5, lines 11-14);

determining an indicator (IND[i]) as function of the transcoding channel video complexity and associated weighting factor (page 4, line 32 – page 5, line 1); and

allocating the output bit rate (Rout[i]) to the transcoding channel from a total output bit rate, its corresponding indicator and a sum of the indicators of the transcoding channels (page 5, lines 2-4).

As claimed in independent claim 4, an embodiment (FIG. 2) of the invention comprises a controller (CONT) for controlling a set of transcoders (TC[i]), a transcoder (TC[i]) allowing an input compressed data signal (ICS[i]) encoded at an input bit rate (Rin[i]) to be converted into an output compressed data signal (OCS[i]) encoded at an output bit rate (Rout[i]) wherein a regulation process uses quantization scales and the input compressed data signal to determine a video encoding complexity (page 5, lines 5-10), said controller comprising:

a processor (CONT) configured to determine a weighting factor (wf[i]) of a compressed data quality for the respective transcoders channel (TC[i]), the weighting factor being computed for a current picture from the input compressed data signal as an average, over a set of preceding encoded pictures, of an average quantization scale over a preceding picture and a number of bits used to encode the same preceding picture (page 5, lines 11-14);

determining an indicator (IND[i]) as a function of the transcoding channel video complexity and associated weighting factor (page 4, line 32 – page 5, line 1); and

allocate the output bit rate (Rout[i]) to the transcoder from a total output bit rate, its corresponding indicator and a sum of the indicators of the transcoders (page 5, lines 2-4).

As claimed in independent claim 5, an embodiment (FIG. 2) of the invention comprises a data multiplexing system comprising:

a set of transcoders (TC[i]) for converting input compressed data signals (ICS[i]) encoded at an input bit rate (Rin[i]) into output compressed data signals (OCS[i]) encoded at an output bit rate (Rout[i]), wherein a regulation process uses quantization scales and the input compressed data signal to determine a video encoding complexity (page 5, lines 5-10),

a controller (CONT) for controlling the set of transcoders and comprising:

means for computing a weighting factor (wf[i]) of a compressed data quality for the respective transcoders, the weighting factor being computed for a current picture of the input compressed data signal as an average, over a set of encoded pictures, of an average quantization scale over a preceding picture and a number of bits used to encode the same preceding picture (page 5, lines 11-14);

means for determining an indicator (IND[i]) as a function of the transcoding channel video complexity and associated weighting factor (page 4, line 32 – page 5, line 1);

means for allocating the output bit rate (Rout[i]) to the transcoder from a total output bit rate, its corresponding indicator and a sum of the indicators of the transcoders (page 5, lines 2-4), and

a multiplexer (MUX) for providing a multiplexed data signal at the total output bit rate by multiplexing of the output compressed data signals (page 4, lines 13-15).

As claimed in independent claim 6, an embodiment of the invention comprises a computer program product (page 6, lines 23-29) for a controller that comprises a set of instructions, which, when loaded into the controller, causes the controller to:

compute a video encoding complexity using quantization scales and an input compressed data signal (page 5, lines 5-10);

compute a factor (wf[i]) for a current picture of the input compressed data signal as an average, over a set of encoded pictures, of an average quantization scale over a picture and a number of bits used to encode the same picture (page 5, lines 11-15),

determine an indicator (IND[i]) as a function of the transcoding channel video complexity and associated weighting factor (page 4, line 32 – page 5, line 1); and

allocate an output bit rate (Rout[i]) to the transcoding channel from a total output bit rate, its corresponding indicator and a sum of the indicators of the transcoding channels (page 5, lines 2-4).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 2-7 stand rejected under 35 U.S.C. 103(a) over Wang et al. (USP 6,167,084, hereinafter Wang) and Wu (USP 6,963,608).

VII. ARGUMENT

Claims 2-7 stand rejected under 35 U.S.C. 103(a) over Wang and Wu

MPEP 2142 states:

> "To establish a *prima facie* case of obviousness ... the prior art reference (or references when combined) ***must teach or suggest all the claim limitations***... If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness."

Claims 2-3

Claim 2, upon which claim 3 depends, claims a method that uses quantization scales and the input compressed data signal to determine a video encoding complexity.

Neither Wang nor Wu teaches or suggests using the input compressed data signal to determine a video encoding complexity.

Both Wang and Wu use characteristics of the prior output compressed data signals to determine the output bit rate for subsequent output compressed data signals. Neither Wang nor Wu uses characteristics of the input compressed data signal to determine the output bit rate, as taught and claimed by the applicant.

As clearly illustrated in Wang's FIG. 6, the output rate R[i] and quantization factor Q[i] of each MPEG encoder 620...650 are provided to the rate control processor 610. As contrast to the applicant's claimed use of characteristics of the input compressed data to determine the output bit rate, the input compressed data Program[i] of Wang is not provided to Wang's rate control processor 610.

In like manner, Wu's FIG. 1 clearly illustrates that the output of each panel compressor 12 is provided to the master compression controller 14; the individual input streams that feed each compressor 12 are not coupled to Wu's compression controller 14.

As taught by the applicant, an output bit rate allocation that is based on the complexity of the encoded output stream often degrades the quality of lower

complexity streams, because highly complex output streams provide a positive feedback that can result in a disproportionate allocation. An indicator that is based on the input compressed data signal provides a control that is independent of this positive-feedback regulation. (Applicant's page 2, lines 17-22; page 2, line 30 – page 3, line 5.)

As clearly illustrated in Wang's FIG. 6 and Wu's FIG. 1, neither Wang nor Wu teaches regulating the encoding complexity based on the input compressed data signal, as specifically claimed in claim 1, and the Office action fails to indicate where either Wang or Wu teaches using characteristics of the input compressed data signal to control the encoding complexity.

The Office action assert that Wang's FIG. 4 teaches "Wang: figure 4, wherein the regulation process is performed by the encoder and decoder" (Office action, page 2, last line – page 3, line 1). The applicant respectfully notes that Wang's FIG. 4 does not illustrate a regulation process. Wang's FIG. 4 merely shows a decoder 400 that decodes an input stream and an encoder 450 that recodes this input stream; the control signals that control/regulate the complexity of Wang's encoder are not illustrated in Wang's FIG. 4, and thus Wang's FIG. 4 cannot be said to teach regulating the encoding complexity based on the input compressed data signal, as asserted in the Office action.

Additionally, claim 2 further includes computing a weighting factor of a current picture of the input compressed data signal based on characteristics of preceding pictures, determining an indicator as a function of the transcoding channel video complexity and associated weighting factor of the input compressed data signal, and allocating the output bit rate to the transcoding channel from a total output bit rate, its corresponding indicator and a sum of the indicators of the transcoding channels.

Neither Wang nor Wu teaches or suggests computing a weighting factor of a current picture of the input compressed data signal based on characteristics of preceding pictures, and neither Wang nor Wu teaches or suggests using such

video encoding complexity and weighting factor to determine an indicator that is used to determine the output bit rate.

The Office action acknowledges that Wang fails to disclose an indicator that is a function of the video complexity and the weighting factor associated with input compressed data signals, and asserts that Wu provides this teaching at column 13, lines 31-40 (Office action, page 3, lines 13-19). At the cited text, Wu teaches:

> "For every picture to be encoded, the MCC rate control algorithm calculates a target for the number of bits to be generated for the frame (FrameTargetBits). The basic idea is to distribute the available bits to the I, P, and B frames in proportion to the complexity estimates adjusted by a set of constant weighting factors (K[I], K[P], K[B]). The weighting factors (K[ ]) account for the different perceptual and statistical characteristics of I, P and B frames. As an example, the weighting factors (0.75, 1.0, 0.75) can be used, although other weighting factors are equally applicable. A portion of the deviation of the actual bits used from the target is fed back to adjust the target for the future frames." (Wu, column 13, lines 31-40.)

As Wu teaches, these weighting factors are constants based on the frame-type of the current frame, and are not based on characteristics of preceding pictures, as specifically claimed in claim 2.

Because neither Wang nor Wu teaches a regulation process that uses quantization scales and the input compressed data signal to determine a video encoding complexity, and because neither Wang nor Wu teaches determining a weighting factor and complexity indicator as claimed, the applicant respectfully maintains that the rejection of claims 2 and 3 under 35 U.S.C. 103(a) over Wang and Wu is unfounded, per MPEP 2142.

Claim 4

Claim 4 claims a controller that includes a processor configured to determine a weighting factor that is computed for a current picture from the input compressed data signal based on characteristics of preceding pictures, determining an indicator as a function of the transcoding channel video

complexity and associated weighting factor, and allocate the output bit rate to a transcoder from a total output bit rate, its corresponding indicator and a sum of the indicators of the transcoders.

As noted above, neither Wang nor Wu teaches determining a weighting factor of a current picture from the input compressed data signal based on characteristics of preceding pictures and using this weighting factor to allocate the output bit rate of a transcoder.

Because both Wang and Wu fail to teach each of the elements of claim 4, the applicant respectfully maintains that the rejection of claim 4 under 35 U.S.C. 103(a) over Wang and Wu, per MPEP 2142.

Claim 5

Claim 5 claims a data multiplexing system that includes a regulation process that uses quantization scales and the input compressed data signal to determine a video encoding complexity.

As noted above, Wang and Wu fail to teach or suggest a regulation process that uses quantization scales and the input compressed data signal to determine a video encoding complexity. As such, the applicant respectfully maintains that the rejection of claim 5 under 35 U.S.C. 103(a) over Wang and Wu, per MPEP 2142.

Claims 6-7

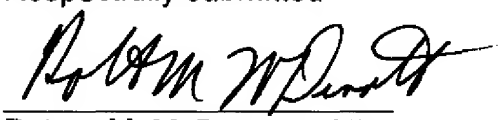
Claim 6 claims a computer program product that causes a controller to compute a video encoding complexity using quantization scales and an input compressed data signal.

As noted above, neither Wang nor Wu teaches computing a video encoding complexity using quantization scales and an input compressed data signal. As such, the applicant respectfully maintains that the rejection of claims 6 and 7 under 35 U.S.C. 103(a) over Wang and Wu is unfounded, per MPEP 2142.

CONCLUSIONS

Because neither Wang nor Wu teach controlling a video encoding complexity based on the input compressed data signal, the applicant respectfully requests that the Examiner's rejection of claims 2-7 under 35 U.S.C. 103(a) be reversed by the Board, and the claims be allowed to pass to issue.

Respectfully submitted



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CLAIMS APPENDIX

1. (Canceled)

2. A method of controlling a plurality of transcoding channels, a transcoding channel allowing an input compressed data signal encoded at an input bit rate to be converted into an output compressed data signal encoded at an output bit rate wherein a regulation process uses quantization scales and the input compressed data signal to determine a video encoding complexity, said method comprising the steps of:

computing a weighting factor of a compressed data quality for the respective transcoding channels, the weighting factor being computed for a current picture of the input compressed data signal as an average, over a set of preceding encoded pictures, of an average quantization scale over a preceding picture and a number of bits used to encode the same preceding picture;

determining an indicator as function of the transcoding channel video complexity and associated weighting factor; and

allocating the output bit rate to the transcoding channel from a total output bit rate, its corresponding indicator and a sum of the indicators of the transcoding channels.

3. A method of controlling a set of transcoding channels as claimed in claim 2, wherein the average is a weighted average of a set of the averages calculated over the set of encoded pictures.

4. A controller for controlling a set of transcoders, a transcoder allowing an input compressed data signal encoded at an input bit rate to be converted into an output compressed data signal encoded at an output bit rate wherein a regulation process uses quantization scales and the input compressed data signal to determine a video encoding complexity, said controller comprising:

a processor configured to determine a weighting factor of a compressed data

quality for the respective transcoders channel, the weighting factor being computed for a current picture from the input compressed data signal as an average, over a set of preceding encoded pictures, of an average quantization scale over a preceding picture and a number of bits used to encode the same preceding picture;

determining an indicator as function of the transcoding channel video complexity and associated weighting factor; and

allocate the output bit rate to the transcoder from a total output bit rate, its corresponding indicator and a sum of the indicators of the transcoders.

5. A data multiplexing system comprising:

a set of transcoders for converting input compressed data signals encoded at an input bit rate into output compressed data signals encoded at an output bit rate, wherein a regulation process uses quantization scales and the input compressed data signal to determine a video encoding complexity,

a controller for controlling the set of transcoders and comprising:

means for computing a weighting factor of a compressed data quality for the respective transcoders, the weighting factor being computed for a current picture of the input compressed data signal as an average, over a set of encoded pictures, of an average quantization scale over a preceding picture and a number of bits used to encode the same preceding picture;

means for determining an indicator as function of the transcoding channel video complexity and associated weighting factor;

means for allocating the output bit rate to the transcoder from a total output bit rate, its corresponding indicator and a sum of the indicators of the transcoders, and

a multiplexer for providing a multiplexed data signal at the total output bit rate by multiplexing of the output compressed data signals.

6. A computer program product for a controller that comprises a set of instructions, which, when loaded into the controller, causes the controller to:

compute a video encoding complexity using quantization scales and an input compressed data signal;

compute a factor for a current picture of the input compressed data signal as an average, over a set of encoded pictures, of an average quantization scale over a picture and a number of bits used to encode the same picture,

determine an indicator as a function of the transcoding channel video complexity and associated weighting factor; and

allocate an output bit rate to the transcoding channel from a total output bit rate, its corresponding indicator and a sum of the indicators of the transcoding channels.

7. The computer program product as recited in claim 6, wherein the average is a weighted average of a set of the averages calculated over the set of encoded pictures.

EVIDENCE APPENDIX

No evidence has been submitted that is relied upon by the appellant in this appeal.

RELATED PROCEEDINGS APPENDIX

Appellant is not aware of any co-pending appeal or interference which will directly affect or be directly affected by or have any bearing on the Board's decision in the pending appeal.